University of Agronomic Sciences and Veterinary Medicine of Bucharest
Faculty of Horticulture

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The evolution of the Kingset tomato hybrid in protected crops upon the application of biofertilizers based on bacteria

Authors names: Claudia-Loredana DRAGOMIR, Gheorghița HOZA, Alexandra BECHERESCU, Liliana BĂDULESCU, Ioana CĂTUNEANU, Aurora DOBRIN, Carmen CONSTANTIN.

Coordinator Professor: Dorel HOZA

Introduction

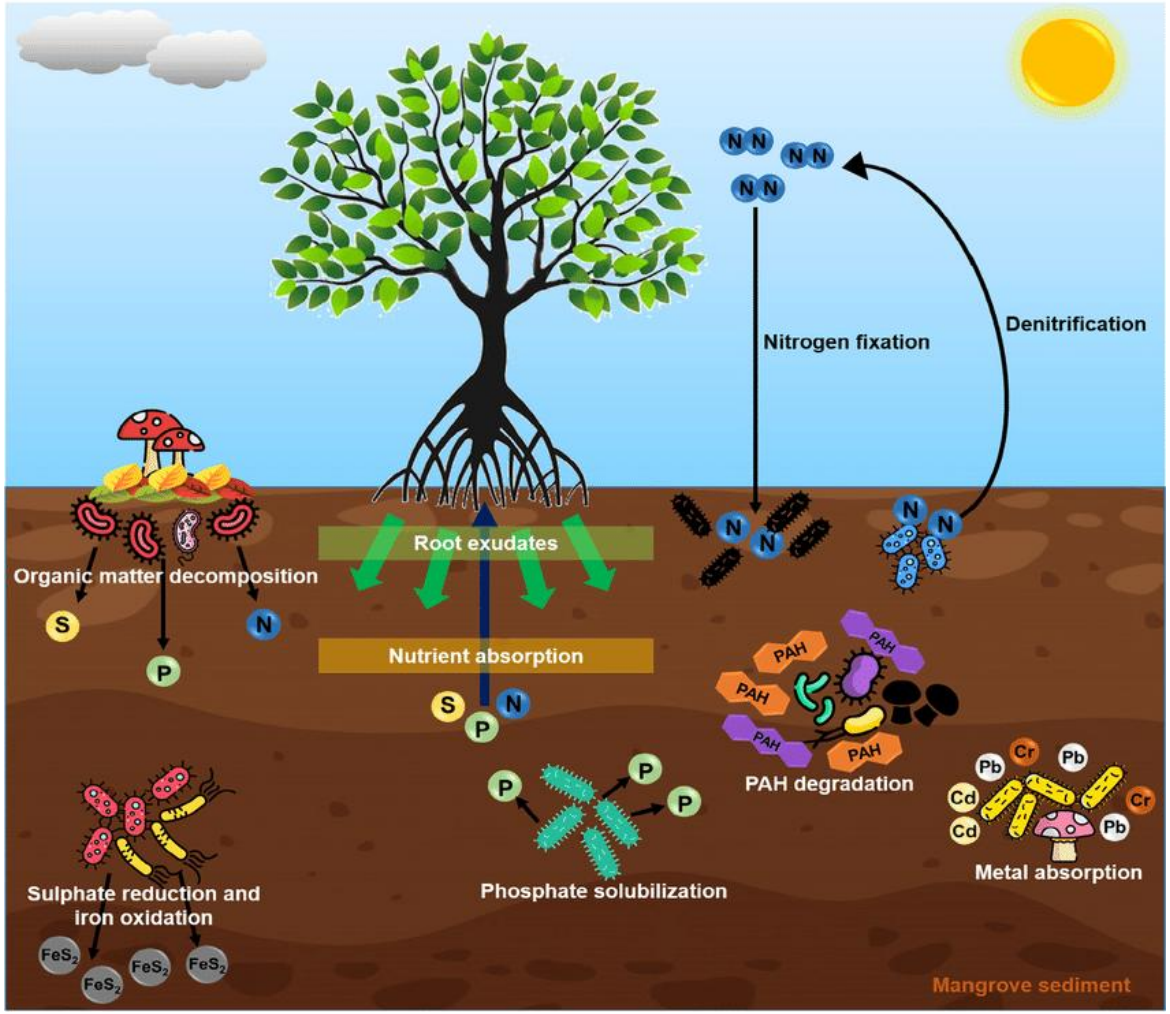
Tomatoes (Lycopersicon esculentum Mill) have their origins in South America and, compared to other vegetable species, have the largest cultivation area in the world, being very appreciated by consumers. The fruits are rich in vitamins, minerals, amino acids and pigments (Dinu, 2017; Soare, 2015) and poor in calories.

Table 1. Food supply quantity (kg/capita/yr)

Number	Area	Value	Grams per day
1	Türkiye	121 kg	332
2	Tunisia	106kg	290
3	Libya	83 kg	227
4	Albania	82 kg	227
5	North Macedonia	69 kg	189
-			
24	China, mainland	37 kg	104
25	Spain	36 kg	101
26	Algeria	36 kg	101
27	China	36 kg	101
28	Romania	36 kg	99

(Retrieved from: FAOSTST,2020)

Introduction



In order to achieve higher quality farmers use products that contain bacteria to increase plant productivity but also to reduce plant residues (Basu, 2021; Chojnacka, 2015), bacteria it is also known in plant pathogenic inhibition and plant growth. Bacillus spp. was noted both for its positive effects on existing microorganisms in the soil but also for a better assimilation of nutrients, which led to increased productivity by facilitating the absorption of mineral nutrients (Kalam, 2020; Sicuia, 2015).

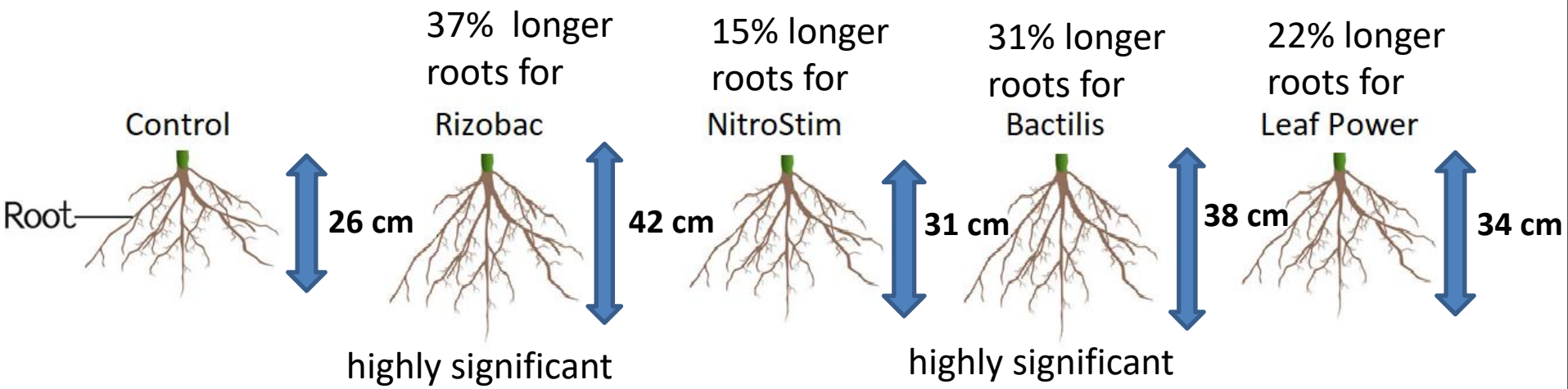
(Retrieved from: https://www.researchgate.net/figure/Intertwined-relationship-of-soil-microbes-and-plants-in-the-mangrove-ecosystem_fig2_358729227)

Materials and Methods

The experiment took place in the Research Greenhouse of University of Agronomic Sciences and Veterinary Medicine of Bucharest (UASVM), during 2022. The main purpose of the experiment was to observe and monitor the main quantitative and qualitative characteristics of hybrids grown in the presence of biostimulating products: Bactilis 5 L/ha (soil application), Leaf Power 5 L/ha (foliar application), NitroStim 5 L/ha (foliar application) and Rizobac 10 L/ha (soil application), the control variant was without biostimulats application. When the plants started to grow, quantitative and qualitative measurements of the plants were made. The determinations were made in the Research Center for Studies of Food Quality and Agricultural Products - University of Agronomic Sciences and Veterinary Medicine of Bucharest, laboratories.

Results and discussions

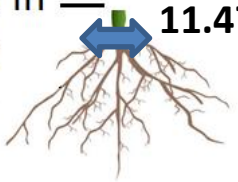
Regarding the root growth parameters the fertilizer stands out positively and statistically significantly in the case of root length.

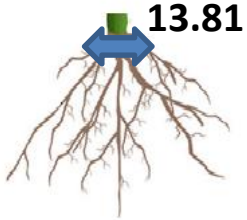


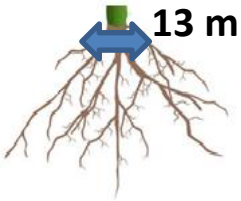
Results and discussions

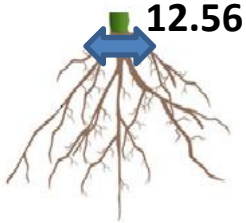
Thus, on stem diameter in the lower part varied between 11.47 mm and 13.81 mm, for control.

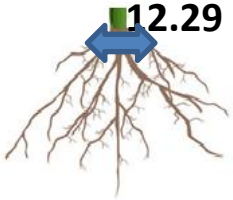
	Control	Rizobac	NitroStim	Bactilis	Leaf Power
Stem diameter in the lower part	11.47 mm	13.81 mm	13 mm	12.56 mm	12.29 mm
		16% bigger stem diameter for	11% bigger stem diameter for	8% bigger stem diameter for	6% bigger stem diameter for











weakly significant

Results and discussions

The height of hybrid was not significantly influenced by biofertilizer application. The highest plant growth in height was 145.83 cm when applying Leaf Power, while by applying Bactilis products, NitroStims and Rizobac the plant growth had fairly close values. Differences of 1-2% between biofertilizers.

h = 143.17 cm
Control

h = 139.83 cm
Rizobac

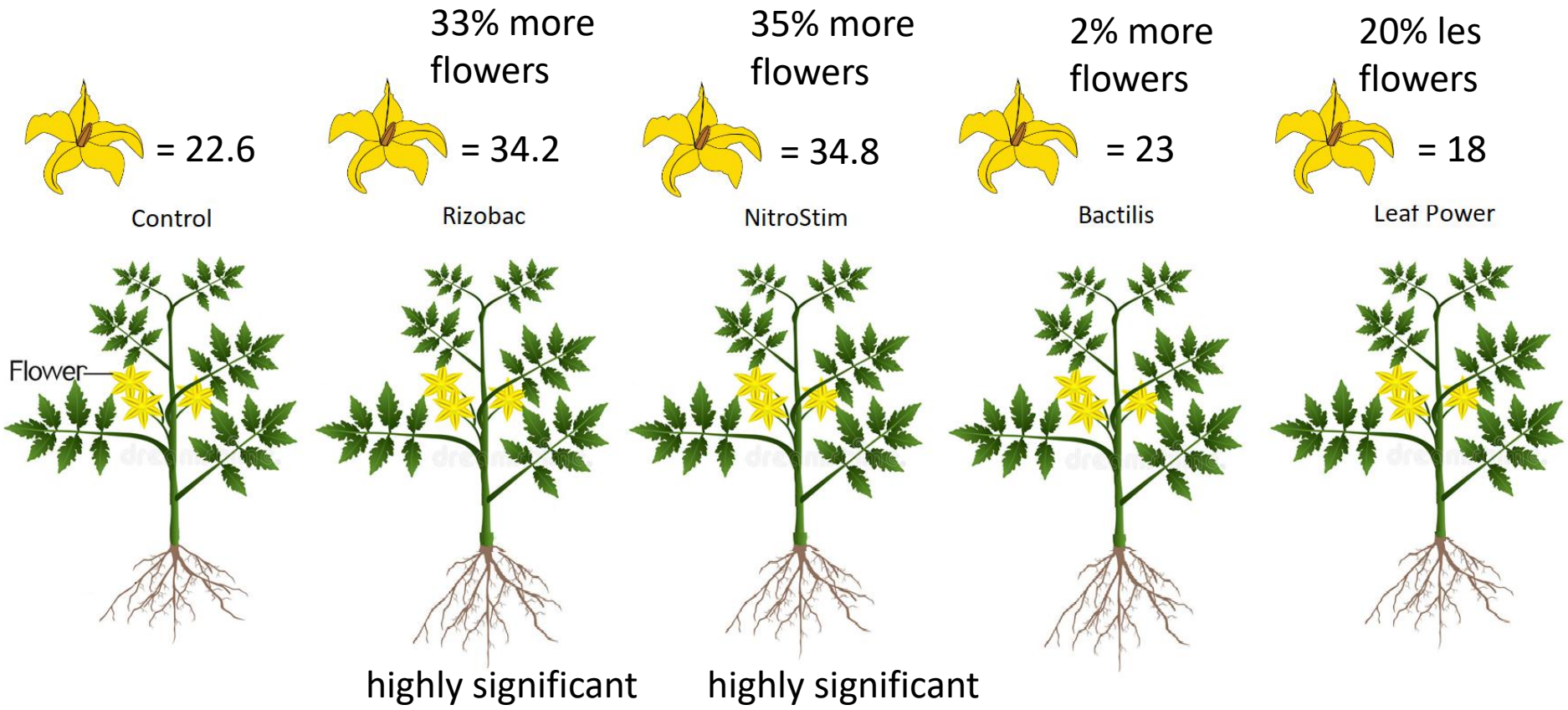
h = 141.67 cm
NitroStim

h = 145.33 cm
Bactilis

h = 145.83 cm
Leaf Power

Results and discussions

The productive capacity of the tomato plants was influenced by the hybrid, and application of biofertilizers, led to a visible improvement in the number of flowers, that increased from 22.6 flowers in the control, to 34.8 flowers when Rizobac was applied.



Results and discussions

The influence of Rizobac can also be seen in the total number of fruits/plant of 18 compared to control, with 12.8 fruits.

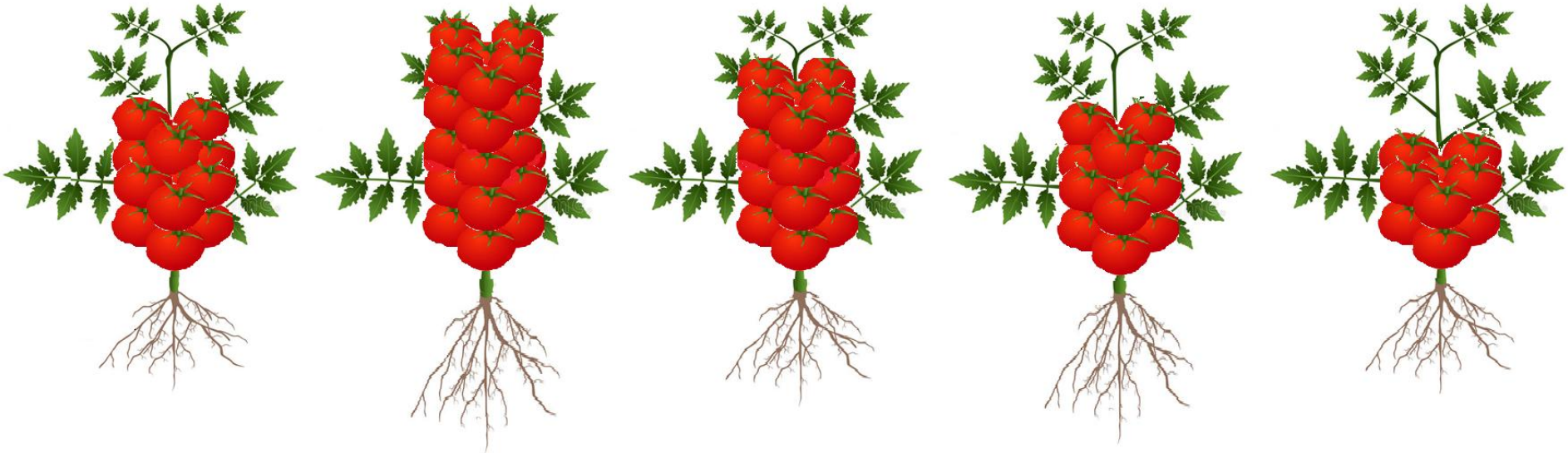
= 12.8
Control

29% more fruits
= 18
Rizobac

21% more fruits
= 16.2
NitroStim

4% more fruits
= 13.4
Bactilis

26% les fruits
= 9.4
Leaf Power



highly significant

weakly significant

weakly significant

Results and discussions

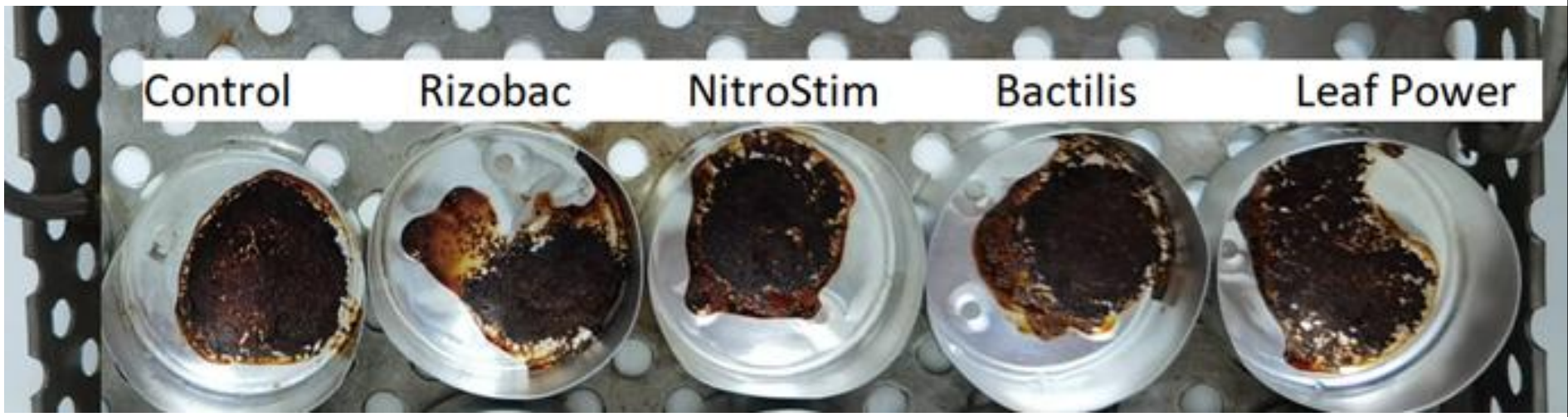
The total dry matter content, regarding the Kingset hybrid, was influenced by the application of the following products: NitroStim recorded a value of 4.94%, Bactilis 5.23% and Leaf Power recorded the value of 5.03%, all values being higher than the unfertilized value of 4.62%.

8% higher total dry matter content for

6% higher total dry matter content for

11% higher total dry matter content for

8% higher total dry matter content for

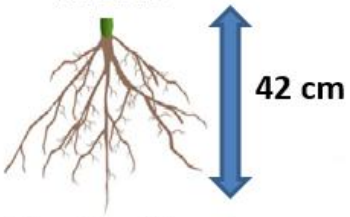


weakly significant highly significant weakly significant

Conclusions and recommendations

In conclusion, the results obtained demonstrated that biofertilizers application on tomato crops in controlled environment, can be a sustainable for tomatoes crops.

37% longer roots for Rizobac



highly significant

h = 145.83 cm
Leaf Power

35% more flowers

= 34.8

NitroStim

29% more fruits

= 18
Rizobac

highly significant

11% higher total dry matter content for Bactilis

Thank you for attention
Rizobac
NitroStim
Bactilis
Leaf Power

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